

CLAIMS

What is claimed is:

1. A printing ink comprising:
 - (i) a solvent-soluble resin;
 - (ii) an energy curable monomer, oligomer, or mixture thereof; and
 - (iii) a vehicle.
2. The printing ink of claim 1, wherein the energy curable monomer, oligomer, or mixture thereof, is an ethylenically unsaturated monomer, oligomer, or mixture thereof.
3. The printing ink of claim 1, wherein the energy curable monomer, oligomer, or mixture thereof, is in an amount of about 1% to 50% by weight of the printing ink.
4. The printing ink of claim 1, wherein the solvent-soluble resin is in a range between about 0.1% to about 40% by weight of the printing ink.
5. The printing ink of claim 4, wherein the solvent-soluble resin comprises nitrocellulose, acrylate, methacrylate, polyester, polyamide, copolymer of styrene and maleic anhydride, polyurethane and epoxy.
6. The printing ink of claim 1, wherein the vehicle comprises water, methanol, ethanol, n-propanol, iso-propanol, n-butanol, sec-butanol, tert-butanol, iso-butanol, n-pentanol, or ethyl acetate.
7. The printing ink of claim 1 further comprising a photoinitiator.
8. The printing ink of claim 7, wherein the photoinitiator is in an amount between about 0.1% and about 20% by weight of the printing ink.
9. The printing ink of claim 7, wherein the photoinitiator is selected from the group consisting of benzophenone, acetophenone, fluorenone, xanthone,

thioxanthone, carbazole, benzoin, the allyl benzoin ethers, 2- or 3- or 4-bromoacetophenone, 3- or 4-allylacetophenone, m- or p-diacetylbenzene, 2- or 3- or 4-methoxybenzophenone, 3,3'- or 3,4'- or 4,4'-dimethoxybenzophenone, 4-chloro-4'-benzylbenzophenone, 2- or 3-chloroxanthone, 3,9-dichloroxanthone, 2- or 3-chlorothioxanthone, 3-chloro-8-nonyl xanthone, 3-methoxyxanthone, 3-iodixanthone, 2-acetyl-4-methylphenyl acetate, alkyl and aryl ethers of benzoin, phenylglyoxal alkyl acetals, 2,2'-dimethoxy-2-phenyl-acetophenone, 2,2-diethoxyacetophenone, 2,2-diiso-propoxyacetophenone, 1,3-diphenyl acetone, naphthalene sulfonyl chloride, and mixtures thereof.

10. A method of printing comprising:

- (i) printing a substrate with the printing ink of claim 1;
- (ii) drying the printed ink; and
- (iii) exposing the printed ink to an actinic radiation.

11. The method of claim 10, wherein steps (ii) and (iii) are performed sequentially.

12. The method of claim 10, wherein steps (ii) and (iii) are performed simultaneously.

13. The method of claim 10, wherein the actinic radiation is an electron beam.

14. The method of claim 10, wherein the printing ink further comprising a photoinitiator.

15. The method of claim 14, wherein the actinic radiation is a ultraviolet light.

16. The method of claim 14, wherein the photoinitiator is selected from the group consisting of benzophenone, acetophenone, fluorenone, xanthone, thioxanthone, carbazole, benzoin, the allyl benzoin ethers, 2- or 3- or 4-bromoacetophenone, 3- or 4-allylacetophenone, m- or p-diacetylbenzene, 2- or 3- or 4-methoxybenzophenone, 3,3'- or 3,4'- or 4,4'-dimethoxybenzophenone, 4-chloro-4'-

benzylbenzophenone, 2- or 3-chloroxanthone, 3,9-dichloroxanthone, 2- or 3-chlorothioxanthone, 3-chloro-8-nonylxanthone, 3-methoxyxanthone, 3-iodixanthone, 2-acetyl-4-methylphenyl acetate, alkyl and aryl ethers of benzoin, phenylglyoxal alkyl acetals, 2,2'-dimethoxy-2-phenyl-acetophenone, 2,2-diethoxyacetophenone, 2,2-diiso-propoxyacetophenone, 1,3-diphenyl acetone, naphthalene sulfonyl chloride, and mixtures thereof.

17. The method of claim 10, wherein the energy curable monomer, oligomer, or mixture thereof, is an ethylenically unsaturated monomer, oligomer, or mixture thereof.

18. The method of claim 10, wherein the energy curable monomer, oligomer, or mixture thereof, is in an amount of about 1 to 50% by weight of the printing ink.

19. The method of claim 10, wherein the solvent-soluble resin is in an amount of about 0.1% and about 40% by weight of the total ink.

20. The method of claim 10, wherein the vehicle comprises water, methanol, ethanol, n-propanol, iso-propanol, n-butanol, sec-butanol, tert-butanol, iso-butanol, n-pentanol, or ethyl acetate.